

App. Serial No. 10/530,063
Docket No.: BE 020027 US

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Remarks

Claims 1-8 and 17-20 are currently pending in the patent application. For the reasons and arguments set forth below, Applicant respectfully submits that the claimed invention is allowable over the cited references.

The non-final Office Action dated September 27, 2006 indicated the following rejections: claims 1-3 and 6 stand rejected under 35 U.S.C. § 102(b) over Coleman (U.S. 5,155,062); claims 1-3, 6, 8, 17 and 20 stand rejected under 35 U.S.C. § 102(b) over Klumpp et al. (non-patent literature); claims 4 and 5 stand rejected under 35 U.S.C. § 103(a) over Coleman as applied to claims 1-3 and 6 above, and in further in view of Kaeppler et al. (WO 01/14619); and claims 7, 18 and 19 stand rejected under 35 U.S.C. § 103(a) over Coleman in view of Kaeppler et al. as applied to claims 4 and 5 above, and in further view of Kobayashi et al. (non-patent literature).

Applicant respectfully traverses the Section 102(b) rejections of claims 1-3 and 6 because the cited portions of the Coleman reference fail to correspond to the claimed limitations directed to employing nitrogen or a noble gas as a carrier gas (*see, e.g.*, claim 1), and because the Coleman reference teaches away from employing nitrogen as a carrier gas. While the cited portions of the Coleman reference indicate that nitrogen can be present in the source and carrier gases, these cited portions do not teach or suggest using nitrogen as the actual carrier gas for a source gas used in a CVD process (*see, e.g.*, col. 1, lines 35-45). Specifically, the mere presence of nitrogen in a source or carrier gas does not teach employing nitrogen as a carrier gas for a CVD process as in the claimed invention. In addition, the Coleman reference teaches away from using nitrogen in any source or carrier gas to avoid contamination. For instance, as indicated at col. 1, lines 35-53 of the Coleman reference, nitrogen contamination limits the usefulness or application of silicon carbide devices, with a common source of nitrogen contamination being the nitrogen present in the source and carrier gases. Accordingly, the Section 102(b) rejections of claims 1-3 and 6 based upon the Coleman reference are improper, and Applicant requests that they be withdrawn.

Applicant traverses the Section 102(b) rejections of claims 1-3, 6, 8, 17 and 20 because the cited portions of the Klumpp reference fail to correspond to all of the claimed limitations, including those directed to depositing an epitaxial layer on a silicon substrate by

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CVD, and further teaches away from the use of CVD as claimed. The cited portions and corresponding purpose of the Klumpp reference are directed to using plasma-enhanced chemical vapor deposition (PECVD) with a liquid source. For example, the first line of the Introduction indicates that a PECVD method uses "a liquid source instead of source gasses." Klumpp further contrasts its liquid-based PECVD process to thermally grown SiC via CVD with a gaseous source. These cited portions not only fail to teach or suggest the use CVD as previously claimed, they teach away from the use of source gases (*see, e.g.*, the Abstract and Introduction). Therefore, the Section 102(b) rejections of claims 1-3, 6, 8, 17 and 20 based upon the Klumpp reference are improper and Applicant requests that they be withdrawn.

Notwithstanding the above and in an effort to facilitate prosecution, Applicant has amended claim 1 to indicate that the claimed CVD approach implements source gases for CVD of group IV elements on a silicon substrate. As the cited portions of the Klumpp reference teach using a liquid source instead of source gases and further teach away from such use, the Section 102(b) rejections of claims 1-3, 6, 8, 17 and 20 based upon the Klumpp reference are further improper and Applicant requests that they be withdrawn.

Applicant traverses the Section 103(a) rejections of claims 3-4, 7 and 18-19 based upon the Coleman reference because the cited portions of the Coleman reference fail to correspond to the claimed limitations as discussed above. Applicant further submits that the Section 103(a) rejections of claims 3-4, 7 and 18-19 should be removed because claim 1, from which these claims depend, should be allowable as indicated above. "If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious." *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). *See, e.g.*, M.P.E.P. § 2143.03. Accordingly, Applicant requests that all of the Section 103(a) rejections based upon the Coleman reference be withdrawn. Notwithstanding, certain ones of the Section 103(a) rejections are address below.

Applicant further traverses the Section 103(a) rejection of claim 7 because the cited combination of references fails to correspond to claimed limitations directed to CVD at a temperature that facilitates a CVD growth rate of an epitaxial layer that is substantially greater than a CVD growth rate of such an epitaxial layer using hydrogen as a carrier gas. For example, the cited portions of the Kobayashi reference teach that, "(i)n the case where Ar is used as a carrier gas, a drastic reduction of the incubation period is observed compared

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with the case of H₂, without any apparent change in the layer growth rate" (*see, e.g.*, page 687, the Results and discussion section). In this regard, the cited portions of the Kobayashi appear directed to a consistent growth rate approach involving Ar and thus do not teach or suggest a greater growth rate relative to the use of hydrogen as a carrier gas. Therefore, the Section 103(a) rejection of claim 7 is improper and Applicant requests that it be withdrawn.

Applicant further traverses the Section 103(a) rejections of claims 18-19 because the cited portions of the Kobayashi reference do not correspond to claimed limitations directed to CVD approach carried out at a temperature of less than about 600°C. On the contrary, the cited portions of the Kobayashi reference teach a two step process, wherein a Si epitaxial layer is deposited on a Si substrate using CVD at 750°C (*see, e.g.*, page 687, col. 1, third full paragraph). Therefore, the cited portions of the Kobayashi reference fail to teach or suggest a CVD (or other) approach carried out at a temperature of less than about 600°C as claimed. Accordingly, the Section 103(a) rejections of claims 18 and 19 are improper and Applicant requests that they be withdrawn.

In view of the remarks above, Applicant believes that each of the rejections has been overcome and the application is in condition for allowance. Should there be any remaining issues that could be readily addressed over the telephone, the Examiner is asked to contact the agent overseeing the application file, Peter Zawilski, of Philips Corporation at (408) 474-9063.

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